MASTER SYLLABUS

GMMD 351 3D Animation

Created by: Kathleen Mahoney
Updated by: Kathleen Mahoney
A. **TITLE:** 3D Animation

B. **COURSE NUMBER:** GMMD 351

C. **CREDIT HOURS:** (Hours of Lecture, Laboratory, Recitation, Tutorial, Activity)

  # Credit Hours: 3
  # Lecture Hours: 3 per week
  # Lab Hours: per week
  Other: per week

  **Course Length:** 15 Weeks

D. **WRITING INTENSIVE COURSE:** No

E. **GER CATEGORY:**

F. **SEMESTER(S) OFFERED:** Spring

G. **COURSE DESCRIPTION:**
This course is an overview of the techniques and history 3D animation, including character design, modeling, storyboarding, rigging and animating a scene. Students engage in hands-on projects involving the development of hand-drawn and computer-generated animation. Emphasis is placed on understanding the place of animation in the context of the film, television, internet, and gaming industries, project management, and the development of a personal animation style.

H. **PRE-REQUISITES/CO-REQUISITES:**

  a. Pre-requisite(s): GMMD 102 and GMMD 200
  b. Co-requisite(s):
  c. Pre- or co-requisite(s):

I. **STUDENT LEARNING OUTCOMES:**

<table>
<thead>
<tr>
<th>Course Student Learning Outcome [SLO]</th>
<th>PSLO</th>
<th>GER</th>
<th>ISLO</th>
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<tbody>
<tr>
<td>Integrate theories of narrative, immersion, and character development with analysis of animated products.</td>
<td>PSLO 1 Student assessment addresses composition, form, function, and design.</td>
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<td>Assess current trends in animation production.</td>
<td>PSLO 4 Public display of student work demonstrates attention to professional detail.</td>
<td>2 [CA][IA] [PS]</td>
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<td>Compare the immersive qualities of various techniques of animation.</td>
<td>PSLO 6 Student documentation demonstrates awareness of design process (brainstorming, research, problem definition, finalization).</td>
<td>2 [CA][IA] [PS]</td>
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<td>Develop a series of animated characters.</td>
<td>PSLO 5 Public display of student work demonstrates an ability to clearly articulate the purpose of the design to the audience.</td>
<td>1 [O, W]</td>
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<tr>
<td>KEY</td>
<td>Institutional Student Learning Outcomes [ISLO 1 – 5]</td>
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<tr>
<td>ISLO #</td>
<td>ISLO &amp; Subsets</td>
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<tr>
<td>1</td>
<td>Communication Skills</td>
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<td>Oral [O], Written [W]</td>
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<td>2</td>
<td>Critical Thinking</td>
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<td></td>
<td>Critical Analysis [CA], Inquiry &amp; Analysis [IA], Problem Solving [PS]</td>
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<td>3</td>
<td>Foundational Skills</td>
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<td>Information Management [IM], Quantitative Lit./Reasoning [QTR]</td>
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<td>4</td>
<td>Social Responsibility</td>
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<td>Ethical Reasoning [ER], Global Learning [GL], Intercultural Knowledge [IK], Teamwork [T]</td>
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<td>5</td>
<td>Industry, Professional, Discipline Specific Knowledge and Skills</td>
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**J. APPLIED LEARNING COMPONENT:** Yes ___ X ___ No _____

**K. TEXTS:**
Introducing Autodesk Maya 2016: Autodesk Official Press
By Dariush Derakhshani
ISBN-10: 1119059631

**L. REFERENCES:**

**M. EQUIPMENT:**

**N. GRADING METHOD:** A-F

**O. SUGGESTED MEASUREMENT CRITERIA/METHODS:**
- Exams
- Quizzes
- Character studies
- Motion study
- Animated short
- Historical research/emulation project
- Papers
P. **DETAILED COURSE OUTLINE:**

I. **Introduction to Computer Graphics and 3D**
   A. 3D Computer Graphics
   B. The Stages of Production
   C. Basic Film Concepts

II. **User Interface**
   A. Preproduction Process
   B. Production Process
   C. Hierarchy and Object Structure

III. **The Autodesk Maya Interface**
   A. Navigating in Maya
   B. Exploring the Maya Layout
   C. Mapping Reference Planes

IV. **Beginning Polygonal Modeling**
   A. Polygon Basics
   B. Polygon Editing Tools
   C. Polygon Mesh

V. **Modeling with NURBs**
   A. Using NURB surfacing
   B. Patch Modeling
   C. The Lattice Deformer

VI. **Practical Modeling**
   A. Modeling an Object

VII. **Shading and Texturing**
   A. Shader Types
   B. Shader Attributes
   C. Textures and Surfaces

VIII. **Introduction to Animation**
   A. Keyframe Animation
   B. Replacing an Object

IX. **Animation Kinematics**
   A. Skeletons and Kinematics
   B. Basic Kinematic Relationships
   C. Character Rigging

X. **Lighting**
   A. Ray Tracing
   B. Mental Ray
   C. Lighting Effects

XI. **Rendering**
   A. Reflections and Refractions
   B. Using Cameras
   C. Ambient Occlusion

XII. **Dynamics and Effects**
A. Dynamics Overview
B. Rigid body and Soft Dynamics
C. Particle Effects

Q. LABORATORY OUTLINE:
1. Gain a working understanding of the user interface
   a. How to navigate in 3D space
   b. Learn project structure in Maya and how to create projects
2. Recognize and use Maya UI Elements
   a. Maya view panels and windows
   b. Transforming objects in 3D space
   c. Polygon modeling techniques
3. Planning Better Models
   a. Editing polygon geometry
   b. Modeling Toolkit Interface
4. Beginning Polygonal Modeling
   a. Polygon Editing Tools
   b. Polygon Mesh
5. Use surface techniques: Loft, Set Planar, Revolve
   a. Convert NURBS geometry
   b. Create polygon meshes
6. Manipulating curves to create poly meshes with Revolve Surface
   a. Create a shape with path extrusions
   b. Work in Hypershade to assign image maps to objects in the scene
7. Working with Shaders
   a. Create and edit shader networks in the Hypershade window
8. Introduction to Animation
   a. Setting keyframes
   b. Working with principles of squash, stretch, anticipation and follow-through
9. Animation Kinematics
   a. Creating and manipulating a skeleton
   b. Creating a walk cycle
   c. Rig a simple character for animating
10. Lighting
    a. Analyze light attributes and choose appropriate light for a scene
    b. Create mood and realism with shadow maps
11. Setting Up a Scene for Output through Rendering
    a. Choosing resolution and other settings
    b. Working with mental ray
    c. Applying a displacement map
12. Creating Dynamics and Effects
    a. Keyframe animated passive rigid body objects
    b. Rendering an object and a scene